

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	The impact of airplane noise on mental and physical health. A quasi-experimental analysis.
AUTHORS	Wang, Scarlett; Glied, Sherry; Williams, Sharifa; Will, Brian; Muennig, Peter

VERSION 1 – REVIEW

REVIEWER	Shepherd, Daniel Auckland University of Technology, Health Sciences
REVIEW RETURNED	26-Oct-2021

GENERAL COMMENTS	<p>Review of: The impact of airplane noise on mental and physical health. A quasi-experimental analysis.</p> <p>This paper compares two matched areas in New York across time in terms of pre-selected medical condition, where one area has been exposed to increasing levels of aviation noise. The manuscript is well composed, with the study's rationale, design, and method sufficiently expressed without being verbose. The analysis is complex with the findings easier to grasp. If the journal allows supplementary material I'd strongly endorse the inclusion of additional data to supplement Figure 2. The raw data itself has short-comings, but it is what it is, and the authors have striven to perform the strongest analysis possible. Suggestions for the consideration of the authors, the manuscript is so well written the authors have left little for me to complain about:</p> <p>1) Abstract. "...are the externalities of this decision." is a bit vague and perhaps could be better phrased.</p> <p>2) Line 136, not sure the less-than symbol is needed: 18 – 44 years. Likewise I found the reporting of the ranges on line 148 a little confusing. Should it be 2019?</p> <p>3) "...We also visually inspected changes in sound..." To what end? And how were they used?</p> <p>4) People outside of the US will not be familiar with what <i>Medicaid</i> is, so perhaps a sentence-or-two.</p> <p>5) The DNL measure itself has been challenged, some argue that the frequency of noise events is a more informative metric. Irrespective, I would argue given the context and the data at hand the reporting of noise metrics can be considered a courtesy, and the formulation of dose-response relationships an unnecessary supplement.</p>
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	<p>6) Figure 2. It would be interesting to see the data for the other age groups as well.</p> <p>7) I would have liked more in the discussion – perhaps some comparisons to studies undertaken outside of New York :-)</p>
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REVIEWER	Goldblatt, Peter University College London, UCL Institute of Health equity
REVIEW RETURNED	27-Oct-2021

GENERAL COMMENTS	<p>This paper has exploited a natural experiment, the diversion of flights taking off from an airport (La Guardia) over a populated area to examine the impact of the additional noise on the health of the population affected. The paper compares the increase in various health problems in the locality affected (Flushing) with that in a control area.</p> <p>It is clear from the description of the change in flightpath (but not explicitly stated) that the issue in Flushing is the noise made by aircraft on full power immediately after take-off. This is the point of maximum noise of an aircraft's flight. To enable others to generalise from this experiment, it would be helpful if the authors</p> <p>(a) made explicit that it was this relatively high level of noise that had the magnitude of effect described - rather than all aircraft noise (whose effect presumably depends on factors such as the number of decibels at ground level).</p> <p>(b) used exemplar data from flight tracking websites, such as Flight Aware, Flight Radar or Flight Stats to indicate the height reached by typical aircraft while over the study area. If available, for example based on quantified exposure "using the Integrated Noise Model in DNL (day-night average sound level) units"- see page 7, line 158). the typical noise footprint over the area would be helpful in judging the level on the dose-response curve that is being measured in this study.</p> <p>Specific drafting points</p> <p>Page 2, line 64</p> <p>The phrase "are the externalities of this decision" might be better expressed in plain English as the main conclusion of the paper. For example, "were associated with an increase in the population exposed to the noise of aircraft taking off".</p> <p>Page 5, line 78</p> <p>The use of the word "traditionally" in the phrase "When aircraft enter urban airspace, they traditionally approach and depart over areas that are less populated" is perhaps an over generalisation. First, this was not the primary concern when airfields were first expanded after the Second World War to accommodate commercial flying - an extreme example being Berlin Tempelhof. Second, there is less concern about approach paths avoiding highly populated areas than immediately after takeoff e.g. most flights into London Heathrow approach over the centre of the city. and make the final approach over Hounslow.</p> <p>Page 10, line 236</p>
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	<p>The fact that one author is a member of Queens Quiet Skies should be identified as a potential conflict of interest.</p> <p>Page 16</p> <p>The paper should include a section on limitations. In particular, this is an ecological study. The change in population health might have been associated with increased noise but not caused directly. For example, the increased noise could have created greater population churn and a fall in property prices - with poorer people moving into the area with worse health. equally there may have been unmeasured factors in Flushing which coincidentally led to greater ill health.</p> <p>A second limitation is that the data presented was for the whole of Flushing and was not disaggregated by level of increased noise i.e. to obtain a dose-response relationship within Flushing.</p> <p>I should emphasise that these are merely potential limitations to be flagged - they do not negate the value of the paper.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

Dr. Daniel Shepherd, Auckland University of Technology

Comments to the Author:

Review of: The impact of airplane noise on mental and physical health.

A quasi-experimental analysis.

This paper compares two matched areas in New York across time in terms of pre-selected medical condition, where one area has been exposed to increasing levels of aviation noise. The manuscript is well composed, with the study's rationale, design, and method sufficiently expressed without being verbose. The analysis is complex with the findings easier to grasp. If the journal allows supplementary material I'd strongly endorse the inclusion of additional data to supplement Figure 2. The raw data itself has short-comings, but it is what it is, and the authors have striven to perform the strongest analysis possible. Suggestions for the consideration of the authors, the manuscript is so well written the authors have left little for me to complain about:

1) Abstract. "...are the externalities of this decision." is a bit vague and perhaps could be better phrased.

Response: Thank you very much. We have re-written this section of the abstract.

2) Line 136, not sure the less-than symbol is needed: 18 – 44 years. Likewise, I found the reporting of the ranges on line 148 a little confusing. Should it be 2019?

Response: Dr. Shepherd's suggestion is well taken. We excluded the less-than symbol for clarity.

2019 was a typo. It should be 2009. Thank you for your diligence.

3) "...We also visually inspected changes in sound..." To what end? And how were they used?

Response: This was done to ensure that the Port Authority estimates had face validity. We have now noted this on line 230.

4) People outside of the US will not be familiar with what *Medicaid* is, so perhaps a sentence-or-two.

Response: Thank you for the suggestion. The text has been added to lines 189-191.

5) The DNL measure itself has been challenged, some argue that the frequency of noise events is a more informative metric. Irrespective, I would argue given the context and the data at hand the reporting of noise metrics can be considered a courtesy, and the formulation of dose-response relationships an unnecessary supplement.

Response: Thank you. We have noted this in the limitations. We do not have data on the frequency of noise exposure. Please see line 436.

6) Figure 2. It would be interesting to see the data for the other age groups as well.

Response: Thank you. We have included these data in Table 2, but include them in the figure so that the reader can get a visual of one table element. In rendering these figures, we felt that they looked a little busy with more than one age group, but if you continue to feel that this is important, we are happy to make changes.

7) I would have liked more in the discussion – perhaps some comparisons to studies undertaken outside of New York :-)

Response: Great point! We have added more to the discussion, starting on line 421.

Reviewer: 2

Prof. Peter Goldblatt, University College London

Comments to the Author:

This paper has exploited a natural experiment, the diversion of flights taking off from an airport (La Guardia) over a populated area to examine the impact of the additional noise on the health of the population affected. The paper compares the increase in various health problems in the locality affected (Flushing) with that in a control area.

1) It is clear from the description of the change in flightpath (but not explicitly stated) that the issue in Flushing is the noise made by aircraft on full power immediately after take-off. This is the point of maximum noise of an aircraft's flight. To enable others to generalise from this experiment, it would be

helpful if the authors

1(a) made explicit that it was this relatively high level of noise that had the magnitude of effect described - rather than all aircraft noise (whose effect presumably depends on factors such as the number of decibels at ground level).

Response: We agree. Please see changes to lines 229-230.

1(b) used exemplar data from flight tracking websites, such as Flight Aware, Flight Radar or Flight Stats to indicate the height reached by typical aircraft while over the study area. If available, for example based on quantified exposure "using the Integrated Noise Model in DNL (day-night average sound level) units"- see page 7, line 158). the typical noise footprint over the area would be helpful in judging the level on the dose-response curve that is being measured in this study.

Response: Thank you. This is a great point. We visually inspected the DNL data for face validity, and also went to the neighborhood to get a subjective sense of what was experienced on the ground. We now mention the subjective inspections for face validity on lines 229-230. However, we did not have the resources available to scrape the data you request. Doing so would require mathematically averaging the available sound meters and computing the distance from the mean departure line. We would also need to write a bot that would scrape data from these websites to obtain the figures for these averages. Because this study was internally funded at Columbia University, we did not have the resources to complete the computations that you request.

The experience on the point of Flushing close to the airport is quite dramatic, with the airplanes appearing very close and banking, such that conversation could not be maintained while shouting.

2. Page 2, line 64

The phrase "are the externalities of this decision" might be better expressed in plain English as the main conclusion of the paper. For example, "were associated with an increase in the population exposed to the noise of aircraft taking off".

Response: Thank you very much. We have corrected this.

3. Page 5, line 78

The use of the word "traditionally" in the phrase "When aircraft enter urban airspace, they traditionally approach and depart over areas that are less populated" is perhaps an over generalisation. First, this was not the primary concern when airfields were first expanded after the Second World War to accommodate commercial flying - an extreme example being Berlin Tempelhof. Second, there is less concern about approach paths avoiding highly populated areas than immediately after takeoff e.g. most flights into London Heathrow approach over the centre of the city. and make the final approach

over Hounslow.

Response: This is a great point. We re-crafted this paragraph such that it uses La Guardia as one example of how some airports are increasingly departing over populated areas to better optimize air traffic. Please see changes to throughout the first paragraph.

4. Page 10, line 236

The fact that one author is a member of Queens Quiet Skies should be identified as a potential conflict of interest.

Response: Agreed. We updated the conflict-of-interest section and on line 306. The authors inspected the Freedom of Information Act documents to ensure that they were accurate. The authors also visited the neighborhood in question, and visually examined the FlightAware data to ensure that there was face validity to the claims.

5. Page 16

The paper should include a section on limitations. In particular, this is an ecological study. The change in population health might have been associated with increased noise but not caused directly. For example, the increased noise could have created greater population churn and a fall in property prices - with poorer people moving into the area with worse health. equally there may have been unmeasured factors in Flushing which coincidentally led to greater ill health.

A second limitation is that the data presented was for the whole of Flushing and was not disaggregated by level of increased noise i.e. to obtain a dose-response relationship within Flushing.

I should emphasise that these are merely potential limitations to be flagged - they do not negate the value of the paper.

Response: Thank you we completely agree. We have updated and greatly expanded the limitations section, beginning on line 429. We also clarify that we only examined zip codes directly under the flight pattern, and compare these to demographically similar zip codes in neighborhoods without exposure to airplane noise before and after 2012.

VERSION 2 – REVIEW

REVIEWER	Shepherd, Daniel Auckland University of Technology, Health Sciences
REVIEW RETURNED	02-Jan-2022
GENERAL COMMENTS	Thank you for addressing my concerns.
REVIEWER	Goldblatt, Peter University College London, UCL Institute of Health equity
REVIEW RETURNED	29-Dec-2021

GENERAL COMMENTS	<p>The authors have adequately addressed all the concerns expressed by the reviewers. There are however, some minor points that could be improved in their redrafted text as follows:</p> <p>Abstract. line 63</p> <p>The conclusion should read " increased exposure to airplane noise was associated with an increase in diagnosis of cardiovascular disease" since we cannot rule out factors such as selective migration changing the health profile of the population affected.</p> <p>Strengths and limitations line 72</p> <p>Insert "health" before "insurance claims database" since Medicaid does not cover other forms of loss that might result from overflying aircraft.</p> <p>Strengths and limitations line 82</p> <p>As in the abstract amend to "dramatic change in aircraft noise was associated with increased diagnoses"</p> <p>How might it impact on policy in the foreseeable future?, lines 104-106</p> <p>The implications of this paper are much stronger than those stated in this section.</p> <p>1) before building new airports or runways or altering existing flight paths, a health impact assessment should be carried out and include the impact of noise levels on health of those affected</p> <p>2) when building new airports or runways or altering existing flight paths this should be done to avoid take-off flight paths passing over residential areas</p>
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VERSION 2 – AUTHOR RESPONSE

Reviewer: 2

Prof. Peter Goldblatt, University College London

Comments to the Author:

The authors have adequately addressed all the concerns expressed by the reviewers. There are however, some minor points that could be improved in their redrafted text as follows:

1. Abstract. line 63

The conclusion should read "increased exposure to airplane noise was associated with an increase in diagnosis of cardiovascular disease" since we cannot rule out factors such as selective migration changing the health profile of the population affected.

Response: Thank you, we have made this change.

2. Strengths and limitations line 72

Insert "health" before "insurance claims database" since Medicaid does not cover other forms of loss that might result from overflying aircraft.

Response: We have done so.

3. Strengths and limitations line 82

As in the abstract amend to "dramatic change in aircraft noise was associated with increased diagnoses"

Response: Thank you, we have done so.

4. How might it impact on policy in the foreseeable future? lines 104-106

Response: This section is not a journal requirement and was removed entirely.

5. The implications of this paper are much stronger than those stated in this section.

1) before building new airports or runways or altering existing flight paths, a health impact assessment should be carried out and include the impact of noise levels on health of those affected

2) when building new airports or runways or altering existing flight paths this should be done to avoid take-off flight paths passing over residential areas

Response: This text was removed.

Response: Thank you for the suggestions. We included the edits in the "Strengths and Limitations" section. We have removed the other sections per the request of the editor.

Reviewer: 1

Dr. Daniel Shepherd, Auckland University of Technology

Comments to the Author:

Thank you for addressing my concerns.

Response: Thank you very much for your time and valuable input.